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Assessment of Obesity Management in a Primary Care Setting

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The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Katie Diffenderfer, Student

Dr. Nancy Kloha, Advisor

Final DNP Project Report

Assessment of Obesity Management in a Primary Care Setting

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Dedication

My DNP Practice Improvement Project is dedicated to my future patients with high BMI who are under my care. My research and work on this project will help me better manage your care and provide the appropriate interventions to address obesity.

Acknowledgements

I would like to thank my advisor, Dr. Nancy Kloha, as well as Dr. Sharon Lock, Dr. Lynn Jensen, and Dr. Dianna Inman. I could not have completed this project without their guidance and support.

I would also like to thank my friends and family for sticking by me throughout these three years of grad school. I wouldn't have made it this far without all of you, and I am truly thankful for your love and support.

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Abstract

Purpose: The purpose of this study was to evaluate the current practices related to obesity in the primary care setting in University of Kentucky's Healthcare System. The specific aims were to: 1) Determine the proportion of obese patients who had an ICD-9/10 diagnosis code for obesity, 2) Determine the proportion of obese patients who received interventions related to their obesity, 3) Determine whether obesity diagnosis and interventions varied based on patient demographics, and 4) Compare actual obesity interventions to those outlined in the clinical practice guidelines.

Methods: A retrospective chart review of male and female patients between the ages of 18 and 60 with BMI $\geq$ 30 was performed. A total of 100 charts of patients meeting inclusion/exclusion criteria between the years of 2013 and 2015 were randomly sampled. Patient demographics and characteristics were recorded into a spreadsheet in the secure Redcaps system, and exported into SPSS to analyze the data.

Results: Most of the differences in obesity-related interventions did not vary significantly based on the patient demographics of gender, race, obesity class, age, and whether comorbidities and family history were listed in the chart. However, some significant results were found. Of the charts reviewed, people with higher obesity classes were found to have a higher likelihood of having an ICD diagnosis code for obesity. Also, African American patients were more likely to have an ICD diagnosis code for obesity than Caucasians and Other races.

Conclusion: This study offers insight into possible gaps in managing obesity in primary care, as well as areas for further research. Providers should assess the weight and BMI of their patients, making sure that the appropriate recommendations are carried out based on clinical practice guidelines. Additional retrospective chart reviews with larger samples should be performed, as well as surveying providers to examine barriers to addressing obesity in primary care.

Assessment of Obesity Management in a Primary Care Setting

Background

Over the years there has been increasing media and medical attention focused towards obesity and the serious problem it poses in the United States (U.S.). Even with this increased awareness of the problem, obesity is still very prevalent today. In 2011-2012, 33.6% of adults 20 and older were obese, and approximately 69% were overweight or obese (Fryar, Carrol, & Ogden, 2013). As of 2013, Kentucky had the fifth highest obesity rate in the nation (Trust for America's Health & Robert Wood Johnson Foundation, 2014).

Less than a third of adults consume the recommended amount of vegetables each day. Furthermore, the majority of adults (81.6%) don't meet national recommendations for the amount of physical activity they should be getting each week (U.S. Department of Health and Human Services [U.S. DHHS], 2013c). Obesity, along with poor diet and exercise habits, is associated with a number of health conditions including heart disease, type 2 diabetes, hypertension, certain cancers, dyslipidemia, stroke, liver and gallbladder diseases, osteoarthritis, gynecological problems, and sleep apnea (National Institutes of Health & National Heart, Lung, and Blood Institute, 1998). Of these obesity-related health problems, heart disease, stroke, and type 2 diabetes are among the leading causes of death for U.S. adults (U.S. DHHS, 2013).

Obesity is also associated with higher medical costs and increased strain on the healthcare system in the U.S. (U.S. DHHS, 2013c). According to the Centers for Disease Control and Prevention (2011), in 2008 the total medical costs related to obesity in U.S. adults were estimated to be as high as $147 billion. With a problem this significant, healthcare providers in the primary care setting are a vital element of the strategies required to appropriately diagnose and effectively manage obesity in patients.

In 2007, out of all of the physician's office visits made by obese adult patients, only 28.9% included education or counseling related to weight reduction, nutrition, or physical activity (U.S. DHHS, 2013a). According to Healthy People 2020, there is a dire need to increase the proportion of office visits where weight-loss counseling and education is provided for obese patients, to address the obesity problem in the U.S. (U.S. DHHS, 2013a).

The American Heart Association (AHA)/American College of Cardiology (ACC) "Guideline for the Management of Overweight and Obesity in Adults" can be used by healthcare providers in practice settings to identify and manage obesity in adults. Analyzing this clinical practice guideline provides important insight into how practitioners can adequately recognize and address the obesity problem in their patient population. According to the AHA/ACC guidelines, the first step in the management of obesity in adults is to identify patients as obese, and all patients should be screened for obesity (Jensen et al., 2013). There are three classes of obesity outlined in the guideline. Class I: BMI 30-34.9, Class II: BMI 35-39.9, and Class III: BMI $\geq$ 40. Adults identified as obese should receive education about appropriate lifestyle changes and adjunctive therapy (Jensen et al., 2013). Evidence shows that behavioral interventions targeting an increase in physical activity and eating a healthier diet can lead to weight reduction in adults (Wolf & Woodworth, 2009).

Taking into account the background and significance of the obesity epidemic in the United States, as well as evidence found in the literature, a related study was planned. This study aimed to evaluate current obesity diagnosis and management practices at an academic healthcare clinic to determine rates of obesity diagnosis, as well as the interventions being carried out to address obesity. This study also aimed to determine how well the recommendations made in the national obesity treatment guidelines are being carried out in this setting.

Purpose

The purpose of this study was to evaluate the current practices associated with obesity in the primary care clinics in a university healthcare setting. The specific aims were to:

1. Determine the proportion of patients seen by primary care clinics in a university healthcare setting between 2013 and 2015 and with BMI $\geq$ 30 who were assigned an ICD-9 or ICD-10 diagnosis for obesity;
2. Determine the proportion of patients seen by primary care clinics in a university healthcare setting between 2013 and 2015 with BMI $\geq$ 30 who received interventions related to their obesity (referrals to nutritionists, bariatric surgeons, or other weight-loss specialists; education related to healthy diet and

exercise, risks of obesity, and ways to lose weight; medications to aid in weight-loss efforts);

3. Determine whether obesity diagnosis and interventions varied based on patient characteristics such as age, gender, ethnicity, class of obesity, comorbidities, and family history;
4. Compare the actual prescribed obesity-related interventions to the recommended practices outlined within national obesity clinical practice guidelines.

Methods

Study Permission

Permission for this study was obtained from the University of Kentucky's Institutional Review Board (IRB). Study permission was obtained by the Principal Investigator (PI). The IRB proposal for this Practice Inquiry Project was approved on February 13, 2016.

Study Demographics and Setting

A retrospective chart review of 100 medical records of patients seen in the primary care clinics of a university healthcare setting between 2013 and 2015 was performed. For patients between 18 and 60 years old with BMI $\geq$ 30, 100 charts were randomly selected for review. Cross-sectional data was collected on specified patient demographics. These included: BMI, Age, Gender, Ethnicity, Comorbidities, and Family History. Types of obesity-related interventions were also evaluated. These included: presence of an ICD-9 or ICD-10 diagnosis code for obesity in the chart; education related to risks of obesity, ways to lose weight, and recommended diet and exercise practices; referrals to nutritionists, bariatric surgeons, and/or other weight-loss specialists; and prescribing medications to aid in weight-loss.

Inclusion and Exclusion Criteria

A set of inclusion and exclusion criteria for the study was formed. The inclusion criteria for this study were: 1) patients seen in primary care clinics in a university healthcare setting; 2) between 2013 and 2015; 3) who were between the ages of 18 and 60; and 4) who had BMI $\geq$ 30. Charts of patients not meeting these criteria were excluded from the study.

Instruments Used

Collected data were recorded into a spreadsheet created by the PI through the Redcaps system. SPSS software was used for statistical analysis. The University of Kentucky College of Nursing statistics department was utilized to help analyze the data obtained from the study.

Study Procedures

First, IRB approval for the study was obtained. Next, medical records that met the specified inclusion criteria were collected by the University of Kentucky's Center for Clinical and Translational Science (CCTS) from primary care clinics in a university healthcare setting and stored in a password-protected server for analysis and storage. The PI randomly selected 100 charts to review. The list of medical record numbers provided to the PI by CCTS was in random order. Additionally, the PI selected every 10^{th} chart from the list. The PI then proceeded to collect data as outlined above, searching the provider's note as needed to determine whether specific interventions were carried out. A data collection form was developed by the PI and was used to collect the data. Demographic data collected from the charts included age, gender, and ethnicity/race. Clinical data collected included BMI, ICD-9 and/or ICD-10 code for obesity (present or not), obesity-related interventions (education, referrals, medications), comorbidities, and family history. The PI accessed the Electronic Health Record (EHR) of the selected patient charts to collect the above data. The PI looked at provider notes for any written indications that the above information was obtained by the provider, and related interventions carried out.

The data provided to the PI from CCTS was not de-identified. However, the PI de-identified the electronic data by assigning each patient a unique patient identifier number. The PI kept a master list with both the patient identifier and medical record numbers, in case data needed to be re-evaluated for accuracy. Only the PI had the written key linking the patient identifier and the medical record numbers. Patients were referred to by this patient identifier number during the course of this study. The list of patient medical record numbers correlating to the unique patient identifier number was kept in a locked desk cabinet in a locked office of a University of Kentucky College of Nursing staff member.

The data were entered into the data collection form spreadsheet in Redcaps, and well as into the SPSS program that was used to analyze the data. Descriptive statistics were used to characterize the sample. Overall patient demographics, prevalence of obesity diagnosis, and interventions received were calculated (See Tables 1, 2, and 3). Statistical analysis performed through SPSS was used to compare the prescribed interventions between ages, genders, ethnicities, obesity class, as well as comorbidities that increase risk of Cardiovascular Disease (e.g. type 2 diabetes, hypertension, high cholesterol), and family history of obesity or related illness (See Tables 4, 5, 6, 7, and 8).

Data Analysis

Data collected by the PI were entered into the spreadsheet in the Redcaps system. The de-identified data was then exported from Redcaps into the SPSS program. The SPSS program was then used to perform statistical analysis of the data. A statistician in the University of Kentucky's College of Nursing was utilized by the PI to assist in statistical analysis of the data. After statistical analysis was carried out, the results were evaluated and conclusions drawn from the data.

Results

Sample Characteristics

Study demographics were analyzed to better understand the characteristics of the randomly sampled charts. Of the 100 charts reviewed, 34% were male patients, and 66% were female patients. As for race, 57% of the charts belonged to Caucasian patients, 36% to African American patients, 6% to Hispanic patients, and 1% to a patient of Other race. For the purpose of statistical analysis, the Hispanic and Other categories were combined into the same category (Other) to help address the issue of small cell size.

The PI also examined the number and percentage of charts in each obesity class. Patients with BMI of 30-34.9 were coded as Class I Obesity, those with BMI of 35-39.9 coded as Class II Obesity, and those with BMI ≥40 were coded as Class III Obesity, as outlined in The American Heart Association (AHA)/American College of Cardiology (ACC) "Guideline for the Management of Overweight and Obesity in Adults" (Jensen et al., 2013). Of the reviewed charts, 44 of the 100 (44%) were of patients with Class I obesity, 27 (27%) Class II obesity, and 29 (29%) Class III obesity. Of the 100 charts, 98% had comorbidities listed for the patient, while 2% did not. Of the reviewed charts,

84% had significant family history listed, 10% did not, and 6% had no data entered into the family history section of the chart (See Table 1).

When looking at the provider interventions that were carried out in the reviewed charts it was found that 44 of the 100 charts (44%) did have an ICD-9 or ICD-10 code present for obesity, while 56 (56%) did not. Of the sampled charts, 23% of patients received education related to their obesity at their last visit, while 77% did not. However, 73% had received related education at some point, while only 27% had never received any relevant education. For the sampled charts, 25% included referrals of some sort by the provider to address obesity, weight-loss, or nutrition, and 75% did not. Only 2 of the 100 charts (2%) mentioned medications used to aid in weight-loss, while 98 (98%) gave no mention of medications prescribed for this purpose (See Table 1).

Presence of ICD Diagnosis Code

The first outcomes the PI examined were whether there was any statistically significant variations in presence of an ICD-9 or ICD-10 diagnosis code for obesity, based on gender, race, obesity class, whether the patient had comorbidities present, and whether significant family history was present. Overall, patients with Class III obesity had the highest rate of ICD code presence at 40.9%. Of the three race categories examined (Caucasian, African American, and Other), African Americans had the highest percentage of ICD code presence at 47.7%.

Of the chi-square analyses performed for the dependent variable of ICD code presence, two significant results were obtained. The first statistically significant finding (*p-value of .039)* was that higher obesity classes had a higher likelihood of an ICD code for obesity being present. The second significant finding (*p-value of .047)* was that African Americans had a statistically significant higher rate of ICD codes for obesity being present than Caucasians (See Table 4).

Patient Education

Next the PI looked for significant differences in those who received relevant education at their last visit or relevant education ever. As for education being provided at the last visit, patients with Class III Obesity received the highest percentage (47.8%) out of the three obesity classes. However, chi-square analysis showed there was not a statistically significant difference between the rate of education being provided to Class

III obese patients and the other two obesity classes. Presence of patient comorbidities did make a statistically significant difference (*p-value .009)* in whether patients received education at their last visit (See Tables 5). As for education ever being provided to the sampled patients, there was no statistically significant difference in education being provided between different obesity classes, races, genders, or depending on whether comorbidities and family history were present (See Table 6).

Patient Referrals

The PI then analyzed the data related to which patients had received referrals. Patients with Class III Obesity received the highest percentage of referrals within the three obesity classes, at 44%. However, there were no statistically significant differences between referrals and obesity class, race, gender, or presence of comorbidities and family history (See Table 7).

Medications Prescribed

The last outcome the PI examined was whether there was any statistical evidence related to which patients received medications related to weight-loss, and which patients did not. As mentioned above, only 2 of the 100 charts reviewed (2%) mentioned medications used to aid in weight-loss, while 98 (98%) gave no mention of mediations prescribed for that purpose. Of the 2 patients who received medications to aid in weight loss, both were female, and both had comorbidities and significant family history present in their chart. One of the recipients was African American, and one was of a different race (Other). One had Class II Obesity (BMI 35-39.9), and one had Class III Obesity (BMI ≥40). There was one statistically significant finding in the chi-square analysis related to medications prescribed, by variable (i.e. gender, race, obesity class, comorbidities, family history). The chi-square analysis of race and prescribed medications showed that Caucasians were statistically significantly LESS likely (*p-value .036)* to receive prescriptions for weight-loss compared to African Americans and those of Other race (See Table 8).

Discussion

These study results and statistical analysis provide some insight into possible gaps in the management of obesity in adults seen in primary care clinics in a university healthcare setting, as well as areas for further research. Overall, only 44 of the 100 charts

(44%) had an ICD-9 or ICD-10 diagnosis code for obesity present. Only 23% of patients had received related education at their last visit. And only 25% received referrals of some sort by the provider to address obesity, weight-loss, and/or nutrition.

More research is needed to determine why statistically significant differences in obesity management outcomes occurred. Researchers should look into why African Americans received a higher rate of ICD code diagnosis, as well as why Caucasians were found to be less likely to be prescribed medications to aid in weight-loss. Provider education related to the importance of obesity diagnosis and interventions could possibly help to address these gaps in care received by patients in the primary care setting. Additionally, knowledge of the current clinical practice guideline recommendations for obesity management in adults could potentially help improve providers' readiness to address this health problem with their patients.

Limitations

Study limitations included small sample size (n=100), and limited study duration (two months). The small sample size could have contributed to the lack of statistical significance seen between the independent and dependent variables, especially when small cell counts were present. Similarly, having a more diverse sample in the future in regards to race and study location could help provide more insight into gaps in addressing obesity in adults in the primary care setting.

Another study limitation was the study design that was used. A retrospective chart review can only be used to identify gaps in addressing obesity in this setting and whether they differ between different populations. However, this study design cannot provide insight into why providers may not be following clinical practice guidelines to diagnose and address obesity, or why differences in obesity management practices occur. Therefore, a provider survey as part of a future study may help provide more details as to why some patients lack an ICD code for obesity, why certain interventions aren't being carried out as often as expected, and why certain patient characteristics may influence these outcomes.

Conclusion

This retrospective chart review examined management of adult obesity in the primary care clinics in a university healthcare setting. Independent variables (i.e. gender,

race, obesity class, comorbidities, family history, and age) were examined in relation to whether the dependent variables (i.e. ICD diagnosis code, patient education, referrals, and prescribing medications) had been included in the chart. Significant findings included higher likelihood of the obesity ICD diagnosis code being present for African Americans, as well as for patients with a higher class of obesity. Patients with comorbidities seemed more likely to have received education at their last visit. Lastly, chi-square analyses suggested that Caucasians were less likely to receive prescriptions for weight-loss compared to African Americans and those of Other race.

Clinical practice guidelines and governmental health agencies assert that providers should assess the weight and BMI of their patients at each visit, making sure that the appropriate guideline recommendations are carried out in patients found to be obese (Jensen et al., 2013; U.S. DHHS, 2013a). This study reveals some potential gaps in diagnosing and addressing obesity in the primary care clinics in a university healthcare setting. Additional retrospective chart reviews with larger samples would be helpful, as well as surveying providers to discover barriers to addressing obesity in primary care. Additionally, educating providers on current guideline recommendations may help increase the rate of patients receiving the above interventions. While this study was a good initial look into the issue of obesity management in primary care, more research needs to be done to properly examine this problem.

Table 1

STUDY DEMOGRAPHICS	
Variable	**Number/ Percent**
Gender	
Males	34 (34%)
Females	66 (66%)
Race	
Caucasian	57 (57%)
African American	36 (36%)
Hispanic	6 (6%)
Other	1 (1%)
BMI Class	
Class I	44 (44%)
Class II	27 (27%)
Class III	29 (29%)
Comorbidities	
Yes	98 (98%)
No	2 (2%)
Family History	
Yes	84 (84%)
No	10 (10%)
Not Listed	6 (6%)
ICD Code Present	
Yes	44 (44%)
No	56 (56%)
Education (Last)	
Yes	23 (23%)
No	77 (77%)
Education (Ever)	
Yes	73 (73%)
No	27 (27%)
Referral	
Yes	25 (25%)
No	75 (75%)
Medications	
Yes	2 (2%)
No	98 (98%)
TOTAL	100 (100%)

Table 2

Comorbidities, If Present

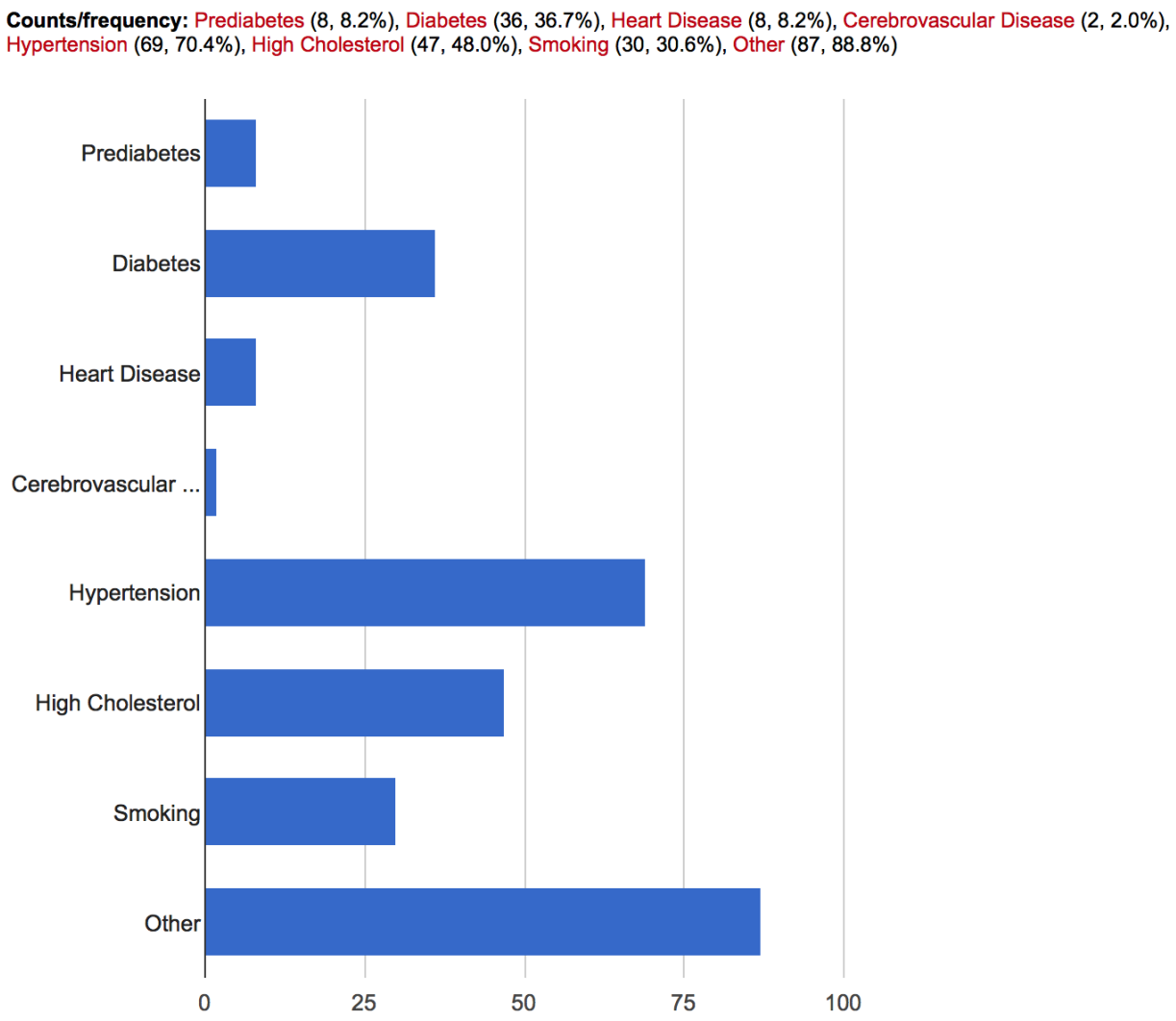

Table 3

Family History Type, If Present

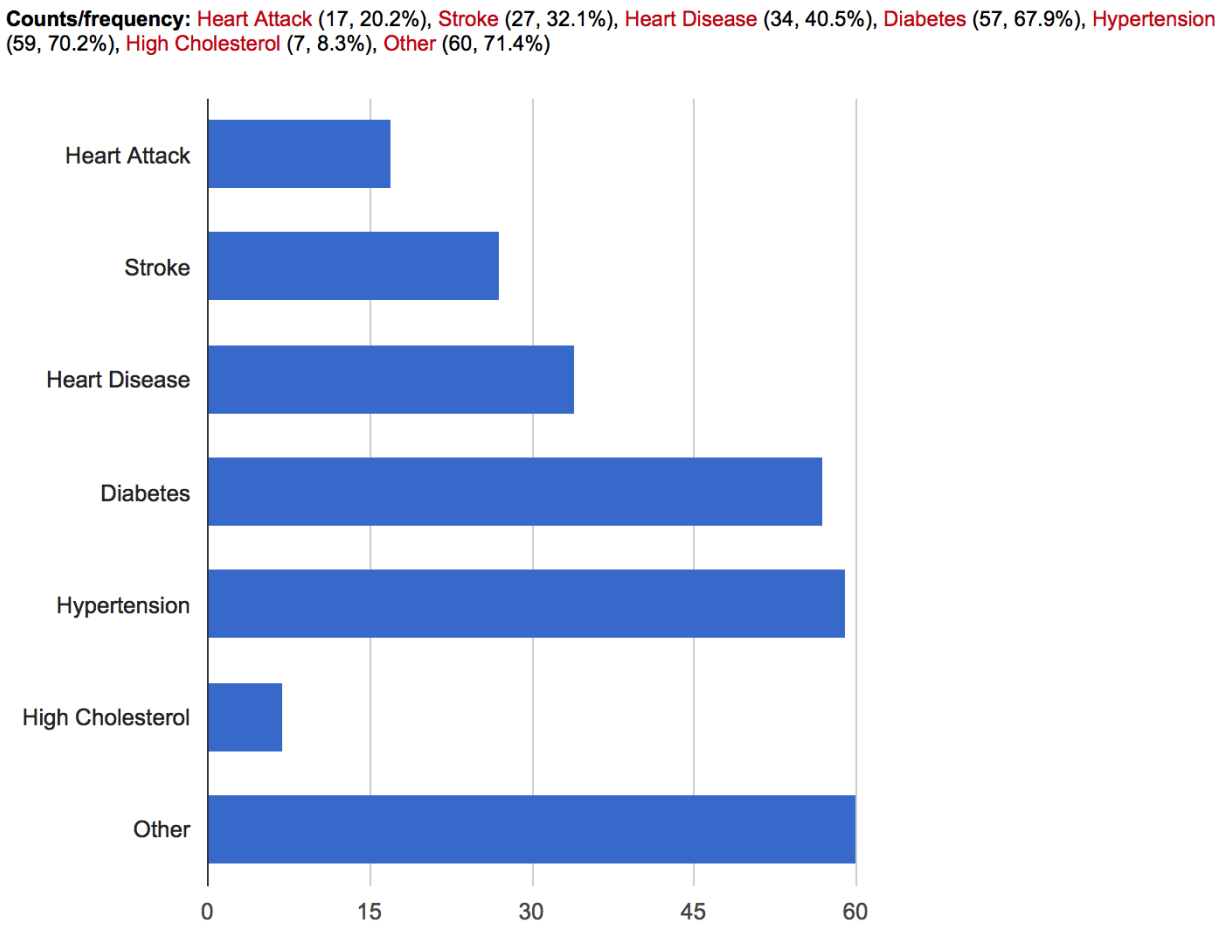

Table 4

PEARSON CHI-SQUARE TEST

ICD-9/ICD-10 DIAGNOSIS CODE PRESENCE AND SIGNIFICANCE, BY VARIABLE

	Diagnosis coded n (%)	Diagnosis not coded n (%)	*p*
BMI Class			**.039***
-1 (30-34.9)	14 (31.8%)	30 (53.6%)	
-2 (35-39.9)	12 (27.3%)	15 (26.8%)	
-3 (≥40)	18 (40.9%)	11 (19.6%)	
Race			**.047***
-Caucasian	19 (43.2%)	38 (67.9%)	
-African American	21 (47.7%)	15 (26.8%)	
-Other	4 (9.1%)	3 (5.4%)	
Gender			**.208**
-Male	12 (27.3%)	22 (39.3%)	
-Female	32 (72.7%)	34 (60.7%)	
Comorbidities			**.863**
-Yes	43 (97.7%)	55 (98.2%)	
-No	1 (2.3%)	1 (1.8%)	
Family History			**.753**
-Yes	38 (90.5%)	46 (88.5%)	
-No	4 (9.5%)	6 (11.5%)	

***** *Indicates a statistically significant p-value*

Table 5

PEARSON CHI-SQUARE TEST

PATIENT EDUCATION (LAST VISIT) AND SIGNIFICANCE, BY VARIABLE

	Patient Education (Last Visit) n (%)	No Education (Last Visit) n (%)	*p*
BMI Class			**.051**
-1 (30-34.9)	9 (39.1%)	35 (45.5%)	
-2 (35-39.9)	3 (13.0%)	24 (31.2%)	
-3 (≥40)	11 (47.8%)	18 (23.4%)	
Race			**.080**
-Caucasian	11 (47.8%)	46 (59.7%)	
-African American	8 (34.8%)	28 (36.4%)	
-Other	4 (17.4%)	3 (3.9%)	
Gender			**.361**
-Male	6 (26.1%)	28 (36.4%)	
-Female	17 (73.9%)	49 (63.6%)	
Comorbidities			**.009***
-Yes	21 (91.3%)	77 (100%)	
-No	2 (8.7%)	0 (0%)	
Family History			**.322**
-Yes	20 (95.2%)	64 (87.7%)	
-No	1 (4.8%)	9 (12.3%)	

***** *Indicates a statistically significant p-value*

Table 6

PEARSON CHI-SQUARE TEST

PATIENT EDUCATION (EVER) AND SIGNIFICANCE, BY VARIABLE

	Patient Education (Ever) n (%)	No Education (Ever) n (%)	*p*
BMI Class			**.281**
-1 (30-34.9)	29 (39.7%)	15 (55.6%)	
-2 (35-39.9)	20 (27.4%)	7 (25.9%)	
-3 (≥40)	24 (32.9%)	5 (18.5%)	
Race			**.720**
-Caucasian	40 (54.8%)	17 (63%)	
-African American	28 (38.4%)	8 (29.6%)	
-Other	5 (6.8%)	2 (7.4%)	
Gender			**.387**
-Male	23 (31.5%)	11 (40.7%)	
-Female	50 (68.5%)	16 (59.3%)	
Comorbidities			**.385**
-Yes	71 (97.3%)	27 (100%)	
-No	2 (2.7%)	0 (0%)	
Family History			**.356**
-Yes	62 (91.2%)	22 (84.6%)	
-No	6 (8.8%)	4 (15.4%)	

** Indicates a statistically significant p-value*

Table 7

PEARSON CHI-SQUARE TEST

REFERRALS MADE AND SIGNIFICANCE, BY VARIABLE

	Referrals Made n (%)	No Referrals Made n (%)	*p*
BMI Class			**.150**
-1 (30-34.9)	8 (32%)	36 (48%)	
-2 (35-39.9)	6 (24%)	21 (28%)	
-3 (≥40)	11 (44%)	18 (24%)	
Race			**.513**
-Caucasian	13 (52%)	44 (58.7%)	
-African American	9 (36%)	27 (36%)	
-Other	3 (12%)	4 (5.3%)	
Gender			**.465**
-Male	7 (28%)	27 (36%)	
-Female	18 (72%)	48 (64%)	
Comorbidities			**.409**
-Yes	25 (100%)	73 (97.3%)	
-No	0 (0%)	2 (2.7%)	
Family History			**.260**
-Yes	22 (95.7%)	62 (87.3%)	
-No	1 (4.3%)	9 (12.7%)	

***** *Indicates a statistically significant p-value*

Table 8

PEARSON CHI-SQUARE TEST

MEDICATIONS PRESCRIBED AND SIGNIFICANCE, BY VARIABLE

	Meds Prescribed n (%)	No Meds Prescribed n (%)	*p*
BMI Class			**.448**
-1 (30-34.9)	0 (0%)	44 (44.9%)	
-2 (35-39.9)	1 (50%)	26 (26.5%)	
-3 (≥40)	1 (50%)	28 (28.6%)	
Race			**.036***
-Caucasian	0 (0%)	57 (58.2%)	
-African American	1 (50%)	35 (35.7%)	
-Other	1 (50%)	6 (6.1%)	
Gender			**.305**
-Male	0 (0%)	34 (34.7%)	
-Female	2 (100%)	64 (65.3%)	
Comorbidities			**.838**
-Yes	2 (100%)	96 (98%)	
-No	0 (0%)	2 (2%)	
Family History			**.622**
-Yes	2 (100%)	82 (89.1%)	
-No	0 (0%)	10 (10.9%)	

* *Indicates a statistically significant p-value*

References

Allen, J. K., Stephens, J., Dennison Himmelfarb, C. R., Stewart, K. J., & Hauck, S. (2013, November 22). Randomized Control Pilot Study Testing Use of Smartphone Technology for Obesity Treatment. *Journal of Obesity*, 1-7. doi:http://dx.doi.org/10.1155/2013/151597

Carter, M. C., Burley, V. J., Nykjaer, C., & Cade, J. E. (2013, April). Adherence to a Smartphone Application for Weight Loss Compared to Website and Paper Diary: Pilot Randomized Controlled Trial. *Journal of Medical Internet Research*, *15*(4), e32. doi:http://dx.doi.org/10.2196%2Fjmir.2283

Centers for Disease Control and Prevention. (2011, May 26). Obesity: Halting the Epidemic by Making Health Easier. In *Centers for Disease Control and Prevention*. Retrieved November 1, 2014, from http://www.cdc.gov/ chronicdisease/resources/publications/ aag/obesity.htm

Fryar, C. D., Carroll, M. D., & Ogden, C. L. (2013, September). NCHS Health E-Stat-Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, 1960–1962 Through 2011–2012. In *Centers for Disease Control and Prevention*. Retrieved October 20, 2014, from http://www.cdc.gov/nchs/data/ hestat/obesity_ adult_11_12/obesity_adult_11_12.htm

Jensen, M. D., Ryan, D. H., Apovian, C. M., Loria, C. M., Ard, J. D., Millen, B. E., & Comuzzie, A. G. (2013, November 12). AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *American College of Cardiology*, 1-69.

doi:10.1016/j.jacc.2013.11.004.

The National Advisory Committee on Rural Health and Human Services. (2005, April). The 2005 Report to the Secretary: Rural Health and Human Service Issues. In *Rural Assistance Center*. Retrieved November 1, 2014, from ftp://ftp.hrsa.gov/ruralhealth/NAC2005.pdf#page=43

National Institutes of Health and National Heart, Lung, and Blood Institute. (September, 1998). Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Retrieved October 22, 2014, from http://www.nhlbi.nih.gov/files/docs/guidelines/ob_gdlns.pdf

Stephens, J., & Allen, J. (2013). Mobile Phone Interventions to Increase Physical Activity and Reduce Weight. *Journal of Cardiovascular Nursing*, *28*(4), 320-329. doi:10.1097/JCN.0b013e318250a3e7.

Trust for America's Health & Robert Wood Johnson Foundation. (2014, September). The State of Obesity: Better Policies for a Healthier America 2014. PP. 1-135. In *State of Obesity*. Retrieved October 20, 2014, from http://www.stateofobesity.org/files/stateofobesity2014.pdf

U.S. Department of Health and Human Services (U.S. DHHS). (2012, December 17). About Healthy People. In *HealthyPeople.gov*. Retrieved March 10, 2014, from http://www.healthypeople.gov/2020/about/default.aspx

U.S. Department of Health and Human Services (U.S. DHHS). (2013a, August 28). Nutrition and Weight Status. In *HealthyPeople.gov*. Retrieved February 21, 2014, from http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=29

U.S. Department of Health and Human Services (U.S. DHHS). (2013b, September 18). Data 2020 Search Results. In *HealthyPeople.gov*. Retrieved February 21, 2014, from http://healthypeople.gov/2020/Data/SearchResult.aspx?topicid=29&topic=Nutrition%20and%20Weight%20Status&objective=NWS-9&anchor=141

U.S. Department of Health and Human Services (U.S. DHHS). (2013c, June 6). Nutrition, Physical Activity, and Obesity. In*HealthyPeople.gov*. Retrieved February 21, 2014, from http://healthypeople.gov/2020/LHI/nutrition.aspx?tab=overview

Wolf, A. M., & Woodworth, K. A. (2009, April). Obesity Prevention: Recommended Strategies and Challenges. *The American Journal of Medicine, 122*(4A), S19-S23. doi:10.1016/j.amjmed.2009.01.004